Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Use of Spectrum Bands Above 24 GHz For Mobile Radio Services	)	GN Docket No. 14-177
	)	
Establishing a More Flexible Framework to Facilitate Satellite Operations in the 27.5-28.35 GHz and 37.5-40 GHz Bands	)	IB Docket No. 15-256
	)	
Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band	)	RM-11664
	)	
Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services	)	WT Docket No. 10-112
	)	
Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations	)	IB Docket No. 97-95

COMMENTS OF SKYRIVER COMMUNICATIONS, INC.

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EXECUTIVE SUMMARY

Skyriver applauds the Commission for its initiative in promoting possible new uses of spectrum above 24 GHz, while at the same time acknowledging that incumbents (including Skyriver) who are productively utilizing their spectrum to deliver much-needed fixed wireless broadband services to the public should be empowered to continue doing so if they so choose. However, certain modifications to the proposed rules are necessary to assure that those companies, like Skyriver, that are successfully competing in the fixed marketplace are not sacrificed to facilitate speculative business models

Although Skyriver's business plan is focused on the provision of fixed broadband services, Skyriver supports the Commission's proposal to adopt service rules that will permit mobile use of the 28 GHz and 39 GHz bands in accordance with the current allocation of those bands for Fixed and Mobile services. Adopting service rules to implement the long-standing Mobile service allocations for the 28 GHz and 39 GHz bands and expanding the flexibility afforded incumbent licensees to offer fixed, mobile or both services is consistent with the Commission's earlier pronouncements and will promote the highest and best uses of the two bands.

The Commission should retain BTAs for 28 GHz licensing and EAs for 39 GHz licensing. EAs and BTAs have proven to be small enough that smaller companies like Skyriver who lack the resources of the larger carriers can nonetheless acquire spectrum, provide the services that the public demands, and satisfy reasonable performance requirements. The Balkanization that would result from using counties for geographic licensing would impose additional costs and regulatory burdens on licensees. Larger areas like BTAs and EAs afford licensees greater economies of scale than smaller geographic service areas, promote deployments in rural areas that would not be served if subject to county-based performance requirements, and minimize the operational and economic costs of interference coordination with neighboring licensees.

The technical rules for the 28 GHz and 39 GHz bands should provide incumbent licensees the flexibility to continue offering existing fixed services. Adoption of the proposed field strength limits would cripple fixed offerings in many cases. To assure that fixed services are not adversely impacted by Commission action in this proceeding, Skyriver suggests that the Commission apply the proposed 47 dBuV/m field strength limit on mobile services, and require frequency coordination for all fixed point-to-point and point-to-multipoint facilities located within 16 kilometers of a UMFUS licensees' BTA or EA boundary along the lines of current Section 101.103(i) of the Rules.

Whatever emission limits the Commission adopts, it should grandfather any deployments using transmission equipment that has been FCC authorized prior to the effective date of the new rules. Licensees have purchased and deployed equipment, and manufacturers have invested in

innovative transmission equipment in reliance on the current rules, and the Commission should not make those investments obsolete as it affords additional flexibility. As for the substantive standard, the proposed -13dBm/MHz limit is achievable at a frequency offset equal to or greater than 100% of the authorized bandwidth from the center of the channel. However, because UMFUS systems likely will be wideband (with channel widths in excess of 50 MHz) and it will be difficult to achieve a step-like mask, Section 30.203 should provide for a gradual slope in the required attenuation up to that offset. We look forward to reviewing the suggestions made by others in response to the *NPRM*'s solicitation of comment and working with the Commission to establish emission limits that are reasonably attainable without imposing unnecessary performance penalties on UMFUS equipment.

Finally, the Commission should adopt the *NPRM*'s proposal that incumbents be permitted to engage in spectrum swaps to consolidate spectrum.

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COMMENTS OF SKYRIVER COMMUNICATIONS, INC.

Skyriver Communications, Inc. ("Skyriver") hereby submits its initial comments in response to the Commission's *Notice of Proposed Rulemaking* ("*NPRM*") in this proceeding.[1]

[1] Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, *Notice of Proposed Rulemaking*, 30 FCC Rcd 11878 (2015) ["*NPRM*"].

Skyriver applauds the Commission for its initiative in promoting possible new uses of spectrum above 24 GHz, while at the same time acknowledging that incumbents (including Skyriver) who are productively utilizing their spectrum to deliver much-needed fixed wireless broadband services to the public should be empowered to continue doing so if they so choose.[2] However, while Skyriver is generally supportive of the direction in which the Commission is headed, certain modifications to the rules proposed in the *NPRM* are necessary to assure that those companies, like Skyriver, that are successfully competing in the fixed marketplace are not sacrificed to facilitate speculative business models.

Skyriver is a fixed wireless broadband service provider, specializing in the provision of robust high speed Internet and private network connections from T1s up to GigE to the business community. We guarantee our customers an industry leading uptime of 99.99%, extremely low latency of less than 40 ms, and 99.5% packet delivery, meeting the needs of our customers' most sophisticated real-time data applications. At present, we serve large portions of southern California and certain areas of Nevada, Arizona and New Mexico utilizing multiple spectrum bands including the 24 GHz band. Our intent is to expand our service area as spectrum becomes available in the 27.5-28.35 GHz ("28 GHz") Local Multipoint Distribution Service ("LMDS") band, the 31-31.3 GHz LMDS band, and the 38.6-40 GHz ("39 GHz") band, and as technology for those bands better allows for the provision of fixed broadband services.[3] To advance those

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[2] *See id.* at 11887 ("Current licensees that choose to continue their existing, authorized services should be able to do so.").

[3] The focus of these comments is on the spectrum proposed to be included in the Upper Microwave Flexible Use Service ("UMFUS") and regulated under a new Part 30. However, Skyriver also supports allocation of the 64-71 GHz band for unlicensed use under Part 15 as proposed in the *NPRM*. *See id.* at 11899-900. To meet the demand for short backhaul and other fixed applications, the Commission should adopt for the 64-71 GHz band the same power limits applicable to the 57-64 GHz band, and in particular allow higher-powered outdoor operations when narrow beamwidth antennas are used. *See id.* at 11967-68.

plans, we have entered into long term spectrum lease agreements in the 31-31.3 GHz LMDS and 39 GHz bands. We are also in the process of developing innovative new radio frequency equipment that will operate in the millimeter wave bands ("mmW") with greater efficiency and lower cost than currently-available equipment, allowing us to provide service where it is today not viable to do so. We anticipate the initial version of our newly-developed equipment will achieve certification in mid-2016 and will be deployed shortly thereafter.

Our concern, simply put, is that while the text of the *NPRM* says the right things about providing incumbents and newcomers the flexibility to provide fixed services of the sort Skyriver is currently providing, the actual proposed Part 30 service rules for the new UMFUS are drawn from the mobile world. If adopted, those proposed rules would effectively require existing service providers in the 28 GHz and 39 GHz bands to materially reduce, if not cease, existing service offerings. If it does nothing else in this proceeding, the Commission should modify proposed Part 30 to assure that Skyriver and others can continue to offer their current services under technical and operational rules that afford the same opportunities as the presently-applicable Part 101 regulations.

I. THE COMMISSION SHOULD AFFORD 28 GHZ AND 39 GHZ BAND LICENSEES THE FLEXIBILITY TO PROVIDE MOBILE SERVICES IF THEY CHOOSE.

At the outset, although Skyriver's business plan is focused on the provision of fixed broadband services, Skyriver supports the Commission's proposal to adopt service rules that will permit mobile use of the 28GHz and 39 GHz bands in accordance with the current allocation of those bands for Fixed and Mobile services.[4] The Commission has recognized, in the *NPRM* and in myriad other proceedings, that rules and policies facilitating flexible use of spectrum are

[4] *See id.* at 11890, *citing* 47 C.F.R. § 2.106.

critical to assuring that spectrum is used efficiently. The 28GHz and 39 GHz bands are no different from the many bands where the Commission's flexible use paradigm has been successfully applied, and there is every reason to believe that mobile services can co-exist in those bands with fixed services of the sort that Skyriver has deployed.

As acknowledged in the *NPRM*, when the Commission limited its initial 28 GHz band service rules to fixed services, it "expressed an expectation that it would expand the LMDS authorization for Fixed Service to include Mobile Service if proposed and supported by the resulting record."[5] Indeed, in adopting the current 28 GHz service rules, the Commission clearly stated:

> Although LMDS is allocated as a fixed service, we know of no reason why we would not allow mobile operations if they are proposed and we obtain a record in support of such an allocation. We believe this would be consistent with our goal of providing LMDS licensees with maximum flexibility in designing their systems. We have authorized other wireless services to include mobile and fixed services, depending on whether developments in the service and related equipment demonstrate a need for changing the rules and a capability for mobile and fixed services to coexist in these bands.[6]

The same is true of the 39 GHz band – although the Commission has not adopted service rules implementing the Mobile service allocation of the band, it authorized licensees to provide both fixed and mobile services, subject to the adoption of mobile service rules in a future proceeding that would focus on the inter-licensee and inter-service interference issues.[7]

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[5] *NPRM*, 30 FCC Rcd at 11890.

[6] Rulemaking To Amend Parts 1, 2, 21, and 25 Of the Commission's Rules to Redesignate The 27.5 GHz Frequency Band, *Second Report and Order, Order on Reconsideration, and Fifth Notice of Proposed Rulemaking*, 12 FCC Rcd 12545, 12637-38 (1997) (citations omitted) ["*LMDS Second Report and Order*"].

[7] *See* Amendment of the Commission's Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Bands, *Report and Order and Second Notice of Proposed Rule Making*, 12 FCC Rcd 18600, 18638 (1997).

Although much work remains to be done before mobile services in the 28 GHz and 39 GHz bands become a reality, the substantial progress cited in the *NPRM* [8] suggest that now is the appropriate time to provide licensees with the promised flexibility to provide mobile services. While coexistence of fixed wireless and mobile services is certainly possible when using different frequencies or serving different areas, providing fixed and mobile services in the same area using the same spectrum will be a challenge. As the *NPRM* correctly notes, affording incumbents flexibility to provide either or both types of service alleviates "concerns about compatibility between fixed and mobile uses because a single licensee will be able to coordinate fixed and mobile operations while avoiding interference."[9] On the other hand, separately licensing a mobile overlay on top of existing fixed licenses is not practical because of the close coordination that is necessarily required for fixed and mobile services to coexist in the same area on a co-channel basis.[10] Indeed, since any new mobile licenses issued as an overlay would, in all fairness, have to be secondary to fixed operations under incumbent licenses, it is questionable whether investment in mobile technology in the 28 GHz band would flow. In contrast, allowing incumbents to provide fixed and/or mobile services as advocated in the *NPRM* will allow the proven market for high-speed fixed wireless services to continue to be served, while providing a path for deployment of mobile services at such time as cost-effective mobile technology is available and the demand forecast by the *NPRM* is proven to exist.

Skyriver appreciates that satellite use of the 28 GHz band may become more difficult as fixed and mobile terrestrial use accelerates. However, satellite services have secondary status in

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[8] *See NPRM*, 30 FCC Rcd at 11891-92.

[9] *Id.* at 11895.

[10] Similarly, because of the coordination involved, it does not appear practical to permit unlicensed use of the 28 GHz band at the same time the band is being licensed for fixed and mobile services.

the band, the band already has been allocated for terrestrial Fixed and Mobile services, and the satellite community has been on notice for close to two decades that terrestrial mobile use of the band would be permitted once the technology evolved.[11] The *NPRM* properly concludes that:

> Under our current rules, FSS use of this band is secondary to LMDS. Furthermore, this band has a co-primary mobile allocation throughout the world. The investments satellite operators have made in Ka-band operations were made with knowledge of their secondary status. The primary reason there has been little discussion of mobile use in this band is that there has not been any technology that would allow for mobile use of the millimeter wave bands such as this one. As that technology develops, it is unreasonable for us to preclude mobile use of this band solely because of pre-existing secondary use.[12]

Similarly, as noted in the *NPRM*, the current 39 GHz band licensing scheme requires the consent of the applicable 39 GHz band terrestrial licensees before any satellite services can be deployed in the band and there is no current use of the 39 GHz band for satellite services that would justify precluding terrestrial mobile use of the 39 GHz band.[13] Nor have satellite interests indicated any possible future offering for the 39 GHz band that cannot be provided over other spectrum

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[11] *See id.* at 11892. *See also* 47 C.F.R. § 25.202(a)(1) n.2. Because satellite users deployed in the 28 GHz band with full knowledge of their secondary status, the Commission should only afford the functional equivalent of co-primary status if the satellite licensee acquires a terrestrial license for a sufficiently-sized zone surrounding its gateway earth station (either at auction or through secondary markets) or enters into a private agreement with applicable licensees.

[12] *See NPRM*, 30 FCC Rcd at 11892 (citations omitted). While it is disappointing that WRC-2015 did not accept proposals by the United States, among others, to advance the mobile use of the 28 GHz band, Skyriver agrees with Chairman Wheeler and Commissioner Rosenworcel that the United States should not be deterred in its efforts to promote the 28 GHz band for mobile use. FCC, Statement of Tom Wheeler, Chairman, Presentation on the outcomes of the International Telecommunication Union's World Radio Conference that took place in November (Dec. 17, 2015); FCC, Statement of Jessica Rosenworcel, Commissioner, International Bureau Presentation on World Radiocommunication Conference 2015 (WRC-15) (Dec. 17, 2015). As the Commission has acknowledged, "not every country will be able to designate exactly the same bands for similar uses because they will have a different needs and incumbent uses." *NPRM*, 30 FCC Rcd at 11892.

[13] *NPRM*, 30 FCC Rcd at 11896. *See also id.* at 11926 ("Under our rules, however, gateway earth stations may only be deployed if the FSS licensee obtains a 39 GHz license in the area where the earth station will be located, or if it enters into an agreement with the corresponding 39 GHz licensee.") (citation omitted).

available to the satellite industry. Moreover, satellite operators who desire to improve on the rights afforded them as secondary licensees have the options of either entering into private agreements with terrestrial licensees or acquiring terrestrial licenses that would obviate the potential for interference to or from satellite operations.

In short, adopting service rules to implement the long-standing Mobile service allocations for the 28 GHz and 39 GHz bands and expanding the flexibility afforded incumbent licensees to offer fixed, mobile or both services is consistent with the Commission's earlier pronouncements and will promote the highest and best uses of the two bands.

II. THE COMMISSION SHOULD RETAIN BTAS FOR 28 GHZ LICENSING AND EAS FOR 39 GHZ LICENSING.

The *NPRM* proposes to employ counties as the geographic area unit for licenses in the 28 and 39 GHz bands, while seeking comment on whether to retain the existing larger license areas of Basic Trading Areas ("BTAs") and Economic Areas ("EAs"), respectively.[14] Skyriver urges the Commission to retain the existing geographic area units for the two bands – counties simply are too small to serve as effective licensing areas and, if employed, will impose unnecessary additional regulatory burdens on licensees.[15]

The current geographic service area units were adopted after substantial consideration of smaller alternatives. In the case of the 28 GHz band, the Commission concluded that "BTAs serve as logical geographic areas for licensing LMDS because they represent the natural flow of

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[14] *See id.* at 11912-13.

[15] The Commission has previously found that the use of EAs facilitates access by smaller carriers because EAs are small enough to provide spectrum access opportunities for such carriers. *See* Service Rules for Advanced Wireless Services H Block – Implementing Section 6401 of the Middle Class Tax Relief and Job Creation Act of 2012 Related to the 1915-1920 MHz and 1995-2000 MHz Bands, *Report and Order*, 28 FCC Rcd 9483, 9500-01 (2013). Moreover, to the extent that any demand exists for county-based licensing, that demand can be met through partitioning of BTAs and EAs.

commerce, comprising areas within which consumers have a community of interest."[16] In so doing, it found that "MSAs and RSAs, which were used for licensing Cellular Service, are much smaller than recently adopted wireless geographic service areas" and that "their use for licensing LMDS might result in an unnecessary fragmentation of natural markets."[17] In selecting EAs for the 39 GHz band, the Commission found that "licensing the 39 GHz band by EAs will provide ample population coverage and allow licensees the flexibility to provide many different types of services, which will promote an equitable distribution of licenses and services among geographic areas, encourage economic opportunities among a wide variety of applicants, and foster investment in and rapid deployment of new technologies and services."[18]

Those findings remain equally valid today. EAs and BTAs have proven to be small enough that smaller companies like Skyriver who lack the resources of the larger carriers can nonetheless acquire spectrum, provide the services that the public demands, and satisfy reasonable performance requirements. While we recognize the considerations identified in the *NPRM* in support of using counties for geographic licensing,[19] the discussion fails to fully consider the ways in which the resulting Balkanization would impose additional costs and regulatory burdens on licensees. The Commission has found that larger areas like BTAs "afford licensees greater economies of scale than smaller geographic service areas."[20] In establishing BTAs as the geographic area for LMDS, the Commission found that having larger service areas

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[16] *LMDS Second Report and Order*, 12 FCC Rcd at 12605 (citation omitted).

[17] *Id.*

[18] Amendment of the Commission's Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Bands, *Memorandum Opinion and Order*, 14 FCC Rcd 12428, 12452-53 (1999) (citation omitted).

[19] *See NPRM*, 30 FCC Rcd at 11912.

[20] *LMDS Second Report and Order*, 12 FCC Rcd at 12606.

will allow core network cost to be aggregated over a larger customer base, facilitating competition with high-speed service alternatives.[21] That certainly has been what Skyriver has found as it has done its business modeling. And, those who do not require service areas as large as EAs or BTAs can always secure more limited service areas through partitioning or secondary market leases.

While the *NPRM* suggests that using counties as the basic unit of geographic licensing will promote deployments because performance requirements will be more limited geographically, Skyriver submits that just the opposite is true. Today, a licensee can meet any request for service in a rural county, even if it is likely to be the only service request in that county, because performance is measured across a BTA or EA. If counties are used as the basis for licensing (and thus for performance evaluation), a licensee will be unlikely to deploy any service in a rural county unless and until it is confident that there will be sufficient demand to allow it to meet the performance requirements.[22] Above 24 GHz, demand in rural counties likely will be limited. Thus, service to rural areas actually will be reduced if counties are the basis for geographic licensing and performance evaluation.

Moreover, using counties as geographic licensing units will impose substantial burdens on licensees as they seek to coordinate their co-channel operations to avoid interference. The *NPRM* makes a flawed assumption – that coverage will be "measured in meters, not kilometers"[23] – and thus underestimates the extent to which coordination among licensees may be required. While the Commission's expectations may prove to be true for mobile services, it

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[21] *See id.*

[22] If a prospective service provider is looking to focus its service offering on rural counties, Skyriver expects it would have little trouble securing access to rural counties through partitioning or spectrum leasing.

[23] *NPRM*, 30 FCC Rcd at 11912.

most certainly is not the case with respect to fixed broadband services such as Skyriver provides to its customers. When our new equipment is deployed in the 39 GHz band later this year, we anticipate path lengths on the order of 3-6 kilometers. As discussed in more detail below, such service would be crippled if the Commission adopts counties as the licensing area and sets a 47 dBμV/m maximum field strength at the county line as proposed.[24] Particularly as licensees deploy a flexible mix of fixed and mobile services, close coordination between neighboring licensees will be essential. BTAs and EAs are defined in such a way that dense urban areas tend to be towards the center, with more rural areas closer to the area boundary, and history has shown that private frequency coordination between neighboring licensees is not problematic when BTAs and EAs are used for licensing.[25] With respect to the 28 GHz and 39 GHz bands, demand for service is likely to be limited in the more rural areas near BTA and EA boundaries, and thus Skyriver anticipates that neighbors should be able to work together to meet demand on either side of the border. However, because counties are substantially smaller (particularly east of the Mississippi River), boundary areas are often rather densely populated. Consider, for example, the dense development that has taken place along the boundaries between the District

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[24] *See id* at 11962.

[25] *See* Amendment of Parts 21 and 74 of the Commission's Rules With Regard to Filing Procedures in the Multipoint Distribution Service and in the Instructional Television Fixed Service, *Report and Order*, 10 FCC Rcd 9589, 9608 (1995) ("BTAs were designed by Rand McNally to represent the natural flow of commerce, comprising areas within which consumers have a community of interest. Like the other types of predetermined geographical areas BTAs vary in size and shape. Typically, a BTA includes a population center(s) (city or large town) and the surrounding rural area."). As noted in the *NPRM*, coordination of fixed 39 GHz links is presently required when either end of the link is located within 16 kilometers of an EA boundary. *See NPRM*, 30 FCC Rcd at 11961-62. That requirement has not been problematic, presumably because EAs are sufficiently large that there are few demands for service near the boundary and adjacent licensees have little incentive to object to coordination.

of Columbia and Montgomery County, Maryland or between Arlington County and Alexandria in northern Virginia (all of which are counties for licensing purposes).

These densely-populated areas near county boundaries often will be difficult to fully serve, particularly where there are disparate licensees on each side of the boundary with different business plans. While coordination among disparate licensees may allow some level of interference-free service near county boundaries, at a minimum county-based licensing will require the negotiation of far more agreements than would be required with larger services areas, adding transaction costs that could be avoided with the use of larger service areas.

While an auction process and secondary markets could be structured to facilitate the consolidation of interdependent county licenses, the Commission has previously found that "these options may result in unproductive regulatory and transaction costs for the Commission and applicants" and, with specific reference to the 28 GHz band that "[t]he use of BTAs alleviates these problems and ensures that LMDS providers can deliver services to the marketplace in a timely and efficient manner."[26]

In short, continued use of BTAs and EAs for licensing in the 28 GHz and 39 GHz bands, respectively, coupled with the options of partitioning and leasing, will best promote the deployment of service offerings in those bands by facilitating aggregation of spectrum in appropriately-sized licensed areas.

[26] *LMDS Second Report and Order*, 12 FCC Rcd at 12605.

III. THE TECHNICAL RULES FOR THE 28 GHZ AND 39 GHZ BANDS SHOULD PROVIDE INCUMBENT LICENSEES THE FLEXIBILITY TO CONTINUE OFFERING EXISTING FIXED SERVICES.

While the *NPRM* evidences an appreciation for the benefits of using the 28 GHz and 39 GHz band for fixed services,[27] and the Commission has made clear that it will not disrupt the fixed services being offered or planned by companies like Skyriver,[28] the technical rules in proposed Part 30 are clearly derived from the mobile world and differ from those currently set forth in Part 101. Skyriver urges the Commission to modify those proposed rules as set forth below to avoid unintended adverse consequences for manufacturers and service providers meeting the needs of the fixed marketplace.

A. ADOPTION OF THE PROPOSED FIELD STRENGTH LIMITS WOULD CRIPPLE FIXED OFFERINGS.

The existing rules applicable to the 28 GHz and 39 GHz bands do not impose any limit on the field strength at a licensee's geographic service area boundary. Instead, those rules merely require coordination where a transmitter is to be located within a given distance of the service area boundary (20 kilometers in the case of the 28 GHz band and 16 kilometers in the case of the 39 GHz band).[29] Those rules have worked well. As noted above, because BTAs and EAs are large and tend to have more rural areas at their outer reaches, demands for service have tended to occur in areas where coordination has not been necessary. And, where coordination has been required, licensees have been cooperative and worked together to promote efficient use of the bands.

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[27] *See NPRM*, 30 FCC Rcd at 11888 ("These frequencies are well suited for backhaul and other fixed point-to-point uses because it is possible to have small, highly directional antennas in these bands which, together with the shorter propagation ranges, facilitate extensive reuse [of] microwave frequencies in the same geographic area."); *id.* at 11895.

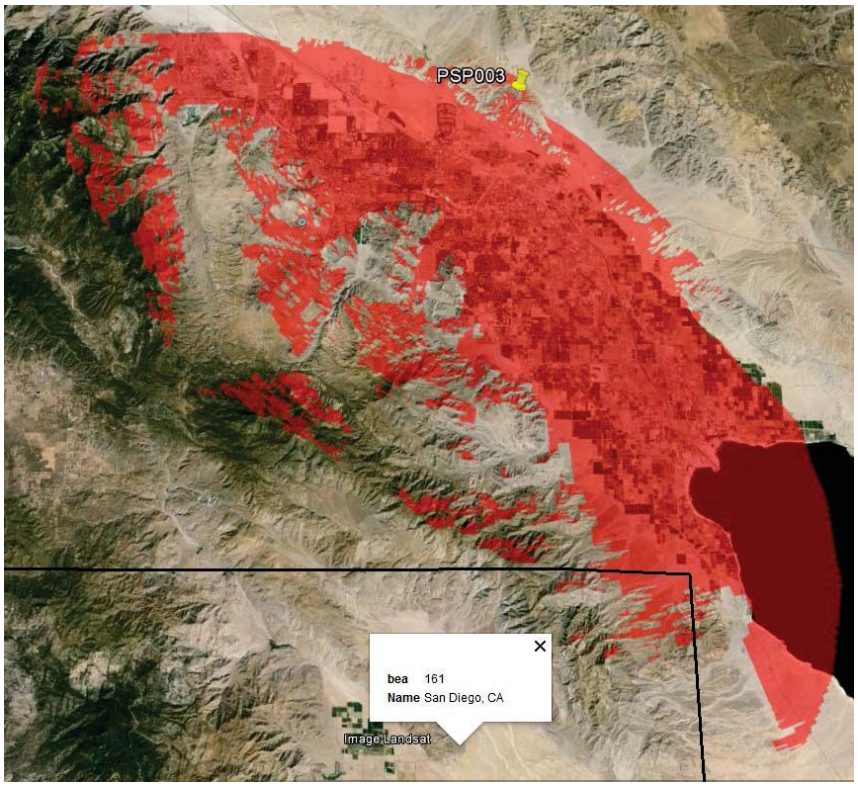
[28] *See id.* at 11887-88.

[29] *See* 47 C.F.R. § 101.103(g), (i).

The *NPRM* solicits comment on alternative approaches, the most troubling of which is the proposal to limit the predicated or a measured median field strength at any location on the geographic border of the licensed service area to no more than 47 dBuV/m.[30] While that is a familiar rule for mobile services, where base stations tend to be lower to the ground than many fixed deployments, it has not been applied in the mmW fixed services. Adoption of that proposal would have a dramatic adverse consequence for fixed service providers. And, that is true even if the Commission retains BTAs and EAs as the 28 GHz and 39 GHz license areas. Were the Commission both to adopt this restriction and use counties as the geographic service area, fixed services of the sort Skyriver provides would often be impossible.

Compliance with the proposed rule would require dramatic reductions in transmit power by fixed service providers. For example, a 39 GHz transmitter that is located just beyond 16 kilometers from the license area boundary, would have to reduce its EIRP to less than -3.8 dBW where there is line of sight between the transmitter and the boundary. Or, assume a point-to multipoint fixed system operating in the Los Angeles EA from a hub site in Indio, CA. That site is located more than 40 kilometers from the San Diego EA. Even if the hub were to operate at 49.5 dBmW (which is significantly below the maximum level allowed under the proposed rules), the 47 dBuV/m limit will be exceeded within the San Diego EA, as illustrated by the red area in the following map:

[30] *See NPRM*, 30 FCC Rcd at 11962.



As this illustrates, while a 47 dBuV/m field strength limit may make sense for mobile operations, it is too restricting for fixed applications where greater path lengths are required. Indeed, if the Commission adopts its proposal, we suspect that many existing fixed links may be non-compliant and service will have to be discontinued.

To assure that fixed services are not adversely impacted by Commission action in this proceeding, Skyriver suggests that the Commission apply the proposed 47 dBuV/m field strength limit on mobile services, and require frequency coordination for all fixed point-to-point and point-to-multipoint facilities located within 16 kilometers of a UMFUS licensees' BTA or EA boundary along the lines of current Section 101.103(i) of the Rules.

B. THE COMMISSION SHOULD GRANDFATHER AUTHORIZED EQUIPMENT FROM ANY NEW EMISSION LIMITS.

As noted in the *NPRM*, the Commission currently imposes several different emission limits for fixed stations operating in the 28 GHz and 39 GHz band, and the *NPRM* solicits

comment on possible standards to be applied to the new UMFUS,[31] while proposed Section 30.203 would require that any emission outside a licensee's frequency block be attenuated below the transmitter power (P) in EIRP by at least $43+10 \log_{10} (P)$ dB.

As a preliminary matter, whatever standard the Commission adopts, it should grandfather any deployments using transmission equipment that has been FCC authorized prior to the effective date of the new rules. Licensees have purchased and deployed equipment, and manufacturers have invested in innovative transmission equipment in reliance on the current rules, and the Commission should not make those investments obsolete as it affords additional flexibility. The existing rules have worked well, and there is no evidence that unwanted emissions allowed under those rules have resulted in any interference. Nor is there any evidence to suggest that allowing fixed point-to-point or point-to-multipoint equipment that comports with the current rules would preclude mobile use of adjacent channels. By grandfathering fixed transmission equipment as proposed, the Commission will allow existing fixed deployments to continue their operations and avoid defeating the reasonable expectations of those who have developed innovative transmission equipment for the fixed marketplace.

The *NPRM* asks "whether a radiated emission limit of 43+10log(P) can be supported by 5G transmitters operating in the [28 GHz, 37 GHz and 39 GHz] bands, and if so, what resolution bandwidth and frequency offset should be considered to define out-of-band emissions and spurious emissions."[32] Skyriver is of the view that the proposed -13dBm/MHz limit is achievable at a frequency offset equal to or greater than 100% of the authorized bandwidth from the center of the channel. However, because UMFUS systems likely will be wideband (with channel widths in excess of 50 MHz) and it will be difficult to achieve a step-like mask, Section

[31] *See id.* at 11958-59.

[32] *See id.* at 11961.

30.203 should provide for a gradual slope in the required attenuation up to that offset.[33] We look forward to reviewing the suggestions made by others in response to the *NPRM*'s solicitation of comment and working with the Commission to establish emission limits that are reasonably attainable without imposing unnecessary performance penalties on UMFUS equipment.

IV. THE COMMISSION SHOULD ADOPT THE PROPOSAL THAT INCUMBENTS BE PERMITTED TO ENGAGE IN SPECTRUM SWAPS.

The *NPRM* solicits comment on a proposal under which incumbent licensees would be permitted to exchange licenses within a market so that they can obtain contiguous spectrum under the applicable bandplans for the 28 GHz and 39 GHz bands.[34] While that proposal should not be applicable to the 28 GHz band (as incumbents are already licensed for the entire contiguous band being addressed by the *NPRM*),[35] Skyriver supports adoption of a voluntary, pre-auction exchange program for incumbents in the 39 GHz band.

At present, the 39 GHz band is subdivided into 14 pairs of non-contiguous 50 MHz channels. Yet, as the *NPRM* recognizes, the consensus of those participating in this proceeding has been that, at a bare minimum, carriers will require 100 MHz of contiguous bandwidth.[36] While Skyriver supports affording licensees the flexibility to use Time Division Duplex ("TDD") or Frequency Division Duplex modulation, we anticipate that the majority of users will opt for

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[33] *See also* Intel, Intel Communication and Devices Group, *5G NOI Technical Rules Device Capabilities*, at 6 (Aug. 5, 2015) (attached to Letter from Dave Horne, Global Public Policy Group, Intel Corporation, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-177 (filed Aug. 10, 2015)).

[34] *See NPRM*, 30 FCC Rcd at 11914 (*citing* Letter from Russell H. Fox, Counsel to Straight Path Communications, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-177 (filed Sept. 11, 2015)).

[35] The proposal had contemplated that the three separate LMDS bands would be brought within the scope of the *NPRM*, and thus there were scenarios under which an exchange might be advantageous. With the Commission's decision to limit the *NPRM* to the 28 GHz portion of the LMDS allocation, that is no longer the case.

[36] *See NPRM*, 30 FCC Rcd at 11886, 11955.

TDD technology. Our experience has been that customer traffic tends to be both asymmetric and bursty, and TDD technology affords the flexibility to maximize data speeds in a spectrally efficient manner.

Allowing incumbents to swap spectrum within their market areas to create contiguous blocks out of the current non-contiguous channel pairs will have two benefits. First, it will provide incumbents with the contiguous spectrum blocks that will allow them to better service the market. While spectrum aggregation technology is improving, service providers that utilize TDD will be able to more efficiently utilize their 39 GHz spectrum if it is in a single contiguous block. And, second, allowing incumbent swaps can result in more contiguous spectrum for the Commission to license through upcoming auctions, increasing the value of the spectrum to be auctioned and facilitating the rapid introduction of advanced service offerings.

For these reasons, Skyriver suggests that prior to auctioning available 39 GHz band spectrum, the Commission establish a procedure by which incumbent licenses can voluntarily elect to have their two 50 MHz channels swapped for a single 100 MHz channel. Those incumbents with multiple licenses in a given market should have the option to have those licenses combined into a contiguous block (*i.e.*, a licensee with two 2x50 MHz licenses could opt to receive a single 200 MHz license).

V. CONCLUSION.

Once again, Skyriver applauds the Commission for its efforts to afford 28 GHz and 39 GHz licensees the flexibility to provide fixed and mobile services in accordance with the existing spectrum allocation for those bands. While it remains to be seen whether the demand for mobile offerings forecast by some will develop, by modifying the service rules for these bands to provide flexible use rights, the Commission can assure that it will not be inadvertently preventing the offering of whatever services prove to be the highest and best use of the band.

With the changes proposed by Skyriver above, the Commission can assure that incumbent licensees and their service offerings are protected, while facilitating whatever highest and best uses of the bands develop in the future.

Respectfully submitted,

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